
**PART O
COKE OVENS**

WAC

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WAC 296-62-200 Coke oven emissions. Scope and application. This section applies to the control of employee exposure to coke oven emissions.
[Order 77-14, 296-62-200, filed 7/25/77.]

WAC 296-62-20001 Definitions. For the purpose of this section:

- (1) **“Authorized person.”** Any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the opportunity to observe monitoring and measuring procedures under WAC 296-62-20025.
- (2) **“Beehive oven.”** A coke oven in which the products of carbonization other than coke are not recovered, but are released into the ambient air.
- (3) **“Coke oven.”** A retort in which coke is produced by the destructive distillation or carbonization of coal.
- (4) **“Coke oven battery.”** A structure containing a number of slot-type coke ovens.
- (5) **“Coke oven emissions.”** The benzenesoluble fraction of total particulate matter present during the destructive distillation or carbonization of coal for the production of coke.
- (6) **“Director.”** The director of the department of labor and industries or his or her authorized representative.
- (7) **“Emergency.”** Any occurrence such as, but not limited to, equipment failure which is likely to, or does, result in any massive release of coke oven emissions.
- (8) **“Existing coke oven battery.”** A battery in operation or under construction on January 20, 1977, and which is not rehabilitated.
- (9) **“Rehabilitated coke oven battery.”** A battery which is rebuilt, overhauled, renovated, or restored such as from the pad up, after January 20, 1977.
- (10) **“Stage charging.”** A procedure by which a predetermined volume of coal in each larry car hopper is introduced into an oven such that no more than two hoppers are discharging simultaneously.

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- (11) **“Sequential charging.”** A procedure, usually automatically timed, by which a predetermined volume of coal in each larry car hopper is introduced into an oven such that no more than two hoppers commence or finish discharging simultaneously although, at some point, all hoppers are discharging simultaneously.
- (12) **“Pipeline charging.”** Any apparatus used to introduce coal into an oven which uses a pipe or duct permanently mounted onto an oven and through which coal is charged.
- (13) **“Green push.”** Coke which when removed from the oven results in emissions due to the presence of unvolatized coal.

[Order 77-14, 296-62-20001, filed 7/25/77.]

WAC 296-62-20003 Permissible exposure limit. The employer shall assure that no employee is exposed to coke oven emissions at concentrations greater than 150 micrograms per cubic meter of air (150 µg/m³), averaged over any 8-hour period.

[Order 77-14, 296-62-20003, filed 7/25/77.]

WAC 296-62-20005 Regulated areas.

- (1) The employer shall establish regulated areas and shall limit access to them to authorized persons.
- (2) The employer shall establish the following as regulated areas:
 - (a) The coke oven battery including topside and its machinery, pushside and its machinery, coke side and its machinery, and the battery ends; the wharf; and the screening station;
 - (b) The beehive oven and its machinery.

[Order 77-14, 296-62-20005, filed 7/25/77.]

WAC 296-62-20007 Exposure monitoring and measurement.

- (1) **Monitoring program.**
 - (a) Each employer who has a place of employment where coke oven emissions are present shall monitor employees employed in the regulated area to measure their exposure to coke oven emissions.
 - (b) The employer shall obtain measurements which are representative of each employee's exposure to coke oven emissions over an eight-hour period. All measurements shall determine exposure without regard to the use of respiratory protection.
 - (c) The employer shall collect full-shift (for at least seven continuous hours) personal samples, including at least one sample during each shift for each battery and each job classification within the regulated areas including at least the following job classifications:
 - (i) Lidman;
 - (ii) Tar chaser;
 - (iii) Larry car operator;
 - (iv) Luterman;
 - (v) Machine operator, coke side;
 - (vi) Benchman, coke side;

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- (vii) Benchman, pusher side;
 - (viii) Heater;
 - (ix) Quenching car operator;
 - (x) Pusher machine operator;
 - (xi) Screening station operator;
 - (xii) Wharfman;
 - (xiii) Oven patcher;
 - (xiv) Oven repairman;
 - (xv) Spellman; and
 - (xvi) Maintenance personnel.
- (d) The employer shall repeat the monitoring and measurements required by subsection (1) of this section at least every three months.
- (2) **Redetermination.** Whenever there has been a production, process, or control change which may result in new or additional exposure to coke oven emissions, or whenever the employer has any other reason to suspect an increase in employee exposure, the employer shall repeat the monitoring and measurements required by subsection (1) of this section for those employees affected by such change or increase.
- (3) **Employee notification.**
- (a) The employer shall notify each employee in writing of the exposure measurements which represent that employee's exposure within five working days after the receipt of the results of measurements required by subsection (1) and (2) of this section.
 - (b) Whenever such results indicate that the representative employee exposure exceeds the permissible exposure limit, the employer shall, in such notification, inform each employee of that fact and of the corrective action being taken to reduce exposure to or below the permissible exposure limit.
- (4) **Accuracy of measurement.** The employer shall use a method of monitoring and measurement which has an accuracy (with a confidence level of 95%) of not less than plus or minus 35% for concentrations of coke oven emissions greater than or equal to 150 U_g/m³.

[Order 77-14, 296-62-20007, filed 7/25/77.]

WAC 296-62-20009 Methods of compliance. The employer shall control employee exposure to coke oven emissions by the use of engineer controls, work practices and respiratory protection as follows:

- (1) Priority of compliance methods.
 - (a) Existing coke oven batteries.
 - (i) The employer shall institute the engineer and work practice controls listed in subsections (2), (3) and (4) of this section in existing coke oven batteries at the earliest possible time, but not later than January 20, 1980, except to the extent that the employer can establish that such controls are not feasible. In determining the earliest possible time for institution

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of engineer and work practice controls, the requirement, effective August 27, 1971, to implement feasible administrative or engineer controls to reduce exposures to coal tar pitch volatiles, shall be considered. Wherever the engineer and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.

- (ii) The engineer and work practice controls required under subsections (2), (3) and (4) of this section are minimum requirements generally applicable to all existing coke oven batteries. If, after implementing all controls required by subsections (2), (3) and (4) of this section, or after January 20, 1980, whichever is sooner, employee exposures still exceed the permissible exposure limit, employers shall implement any other engineer and work practice controls necessary to reduce exposure to or below the permissible exposure limit except to the extent that the employer can establish that such controls are not feasible. Whenever the engineer and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.
- (b) New or rehabilitated coke oven batteries.
 - (i) The employer shall institute the best available engineer and work practice controls on all new or rehabilitated coke oven batteries to reduce and maintain employee exposures at or below the permissible exposure limit, except to the extent that the employer can establish that such controls are not feasible. Wherever the engineer and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.
 - (ii) If, after implementing all the engineer and work practice controls required by (b)(i) of this subsection, employee exposures still exceed the permissible exposure limit, the employer shall implement any other engineer and work practice controls necessary to reduce exposure to or below the permissible exposure limit except to the extent that the employer can establish that such controls are not feasible. Wherever the engineer and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.
- (c) Beehive ovens.
 - (i) The employer shall institute engineer and work practice controls on all beehive ovens at the earliest possible time to reduce and maintain employee exposures at or below the permissible exposure limit, except to the extent that the employer can establish that such controls are not feasible. In determining the earliest possible time for institution of engineer and work practice controls, the requirement, effective August 27, 1971, to implement feasible administrative or engineer controls to reduce exposures to coal tar pitch volatiles, shall be considered. Wherever the engineer and work practice controls

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which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.

- (ii) If, after implementing all engineer and work practice controls required by (c)(i) of this subsection, employee exposures still exceed the permissible exposure limit, the employer shall implement any other engineer and work practice controls necessary to reduce exposures to or below the permissible exposure limit except to the extent that the employer can establish that such controls are not feasible. Whenever the engineer and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.

(2) Engineer controls.

- (a) Charging. The employer shall equip and operate existing coke oven batteries with all of the following engineer controls to control coke oven emissions during charging operations:
 - (i) One of the following methods of charging:
 - (A) Stage charging as described in subsection (3)(a)(ii) of this section; or
 - (B) Sequential charging as described in subsection (3)(a)(ii) of this section except that subsection (3)(a)(ii) and (3)(d) of this section does not apply to sequential charging; or
 - (C) Pipeline charging or other forms of enclosed charging in accordance with (a) of this subsection, except (a)(ii), (iv), (v), (vi) and (viii) of this subsection do not apply.
 - (ii) Drafting from two or more points in the oven being charged, through the use of double collector mains, or a fixed or moveable jumper pipe system to another oven, to effectively remove the gases from the oven to the collector mains;
 - (iii) Aspiration systems designed and operated to provide sufficient negative pressure and flow volume to effectively move the gases evolved during charging into the collector mains, including sufficient steam pressure, and steam jets of sufficient diameter;
 - (iv) Mechanical volumetric controls on each larry car hopper to provide the proper amount of coal to be charged through each charging hole so that the tunnel head will be sufficient to permit the gases to move from the oven into the collector mains;
 - (v) Devices to facilitate the rapid and continuous flow of coal into the oven being charged, such as stainless steel liners, coal vibrators or pneumatic shells;
 - (vi) Individually operated larry car drop sleeves and slide gates designed and maintained so that the gases are effectively removed from the oven into the collector mains;
 - (vii) Mechanized gooseneck and standpipe cleaners;
 - (viii) Air seals on the pusher machine leveler bars to control air infiltration during charging; and

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- (ix) Roof carbon cutters or a compressed air system or both on the pusher machine rams to remove roof carbon.
- (b) Coking. The employer shall equip and operate existing coke oven batteries with all of the following engineer controls to control coke oven emissions during coking operations:
 - (i) A pressure control system on each battery to obtain uniform collector main pressure;
 - (ii) Ready access to door repair facilities capable of prompt and efficient repair of doors, door sealing edges and all door parts;
 - (iii) An adequate number of spare doors available for replacement purposes;
 - (iv) Chuck door gaskets to control chuck door emissions until such door is repaired, or replaced; and
 - (v) Heat shields on door machines.
- (3) **Work practice controls.**
 - (a) **Charging.** The employer shall operate existing coke oven batteries with all of the following work practices to control coke oven emissions during the charging operation:
 - (i) Establishment and implementation of a detailed, written inspection and cleaning procedure for each battery consisting of at least the following elements:
 - (A) Prompt and effective repair or replacement of all engineer controls;
 - (B) Inspection and cleaning of goosenecks and standpipes prior to each charge to a specified minimum diameter sufficient to effectively move the evolved gases from the oven to the collector mains;
 - (C) Inspection for roof carbon build-up prior to each charge and removal of roof carbon as necessary to provide an adequate gas channel so that the gases are effectively moved from the oven into the collector mains;
 - (D) Inspection of the steam aspiration system prior to each charge so that sufficient pressure and volume is maintained to effectively move the gases from the oven to the collector mains;
 - (E) Inspection of steam nozzles and liquor sprays prior to each charge and cleaning as necessary so that the steam nozzles and liquor sprays are clean;
 - (F) Inspection of standpipe caps prior to each charge and cleaning and luting or both as necessary so that the gases are effectively moved from the oven to the collector mains; and
 - (G) Inspection of charging holes and lids for cracks, warpage and other defects prior to each charge and removal of carbon to prevent emissions, and application of luting material to standpipe and charging hole lids where necessary to obtain a proper seal.

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- (ii) Establishment and implementation of a detailed written charging procedure, designed and operated to eliminate emissions during charging for each battery, consisting of at least the following elements:
 - (A) Larry car hoppers filled with coal to a predetermined level in accordance with the mechanical volumetric controls required under subsection (2)(a)(iv) of this section so as to maintain a sufficient gas passage in the oven to be charged;
 - (B) The larry car aligned over the oven to be charged, so that the drop sleeves fit tightly over the charging holes; and
 - (C) The oven charged in accordance with the following sequence of requirements:
 - (I) The aspiration system turned on;
 - (II) Coal charged through the outermost hoppers, either individually or together, depending on the capacity of the aspiration system to collect the gases involved;
 - (III) The charging holes used under (a)(ii) and (b) of this subsection relidded or otherwise sealed off to prevent leakage of coke oven emissions;
 - (IV) If four hoppers are used, the third hopper discharged and relidded or otherwise sealed off to prevent leakage of coke oven emissions;
 - (V) The final hopper discharged until the gas channel at the top of the oven is blocked and then the chuck door opened and the coal leveled;
 - (VI) When the coal from the final hopper is discharged and the leveling operation complete, the charging hole relidded or otherwise sealed off to prevent leakage of coke oven emissions; and
 - (VII) The aspiration system turned off only after the charging holes have been closed.
 - (VIII) Establishment and implementation of a detailed written charging procedure, designed and operated to eliminate emissions during charging of each pipeline or enclosed charged battery.
- (b) **Coking.** The employer shall operate existing coke oven batteries pursuant to a detailed written procedure established and implemented for the control of coke oven emissions during coking, consisting of at least the following elements:
 - (i) Checking oven back pressure controls to maintain uniform pressure conditions in the collecting main;
 - (ii) Repair, replacement and adjustment of oven doors and check doors and replacement of door jambs so as to provide a continuous metal-to-metal fit;
 - (iii) Cleaning of oven doors, chuck doors and door jambs each coking cycle so as to provide an effective seal;

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- (iv) An inspection system and corrective action program to control door emissions to the maximum extent possible; and
 - (v) Luting of doors that are sealed by luting each coking cycle and reluting, replacing or adjusting as necessary to control leakage.
- (c) **Pushing.** The employer shall operate existing coke oven batteries with the following work practices to control coke oven emissions during pushing operations:
 - (i) Coke and coal spillage quenched as soon as practicable and not shoveled into a heated oven; and
 - (ii) A detailed written procedure for each battery established and implemented for the control of emissions during pushing consisting of the following elements:
 - (A) Dampering off the ovens and removal of charging hole lids to effectively control coke oven emissions during the push;
 - (B) Heating of the coal charge uniformly for a sufficient period so as to obtain proper coking including preventing green pushes;
 - (C) Prevention of green pushes to the maximum extent possible;
 - (D) Inspection, adjustment and correction of heating flue temperatures and defective flues at least weekly and after any green push, so as to prevent green pushes;
 - (E) Cleaning of heating flues and related equipment to prevent green pushes, at least weekly and after any green push.
- (d) **Maintenance and repair.** The employer shall operate existing coke oven batteries pursuant to a detailed written procedure of maintenance and repair established and implemented for the effective control of coke oven emissions consisting of the following elements:
 - (i) Regular inspection of all controls, including goosenecks, standpipes, standpipe caps, charging hole lids and castings, jumper pipes and air seals for cracks, misalignment or other defects and prompt implementation of the necessary repairs as soon as possible;
 - (ii) Maintaining the regulated area in a neat, orderly condition free of coal and coke spillage and debris;
 - (iii) Regular inspection of the damper system, aspiration system and collector main for cracks or leakage, and prompt implementation of the necessary repairs;
 - (iv) Regular inspection of the heating system and prompt implementation of the necessary repairs;
 - (v) Prevention of miscellaneous fugitive topside emissions;
 - (vi) Regular inspection and patching of over brickwork;
 - (vii) Maintenance of battery equipment and controls in good working order;
 - (viii) Maintenance and repair of coke oven doors, chuck doors, door jambs and seals; and

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- (ix) Repairs instituted and completed as soon as possible, including temporary repair measures instituted and completed where necessary, including but not limited to:
 - (A) Prevention of miscellaneous fugitive topside emissions; and
 - (B) Chuck door gaskets, which shall be installed prior to the start of the next coking cycle.
- (4) **Filtered air.**
 - (a) The employer shall provide positive-pressure, temperature controlled filtered air for larry car, pusher machine, door machine, and quench car cabs.
 - (b) The employer shall provide standby pulpits on the battery topside, at the wharf, and at the screening station, equipped with positive-pressure, temperature controlled filtered air.
- (5) **Emergencies.** Whenever an emergency occurs, the next coking cycle may not begin until the cause of the emergency is determined and corrected, unless the employer can establish that it is necessary to initiate the next coking cycle in order to determine the cause of the emergency.
- (6) **Compliance program.**
 - (a) Each employer shall establish and implement a written program to reduce exposures solely by means of the engineer and work practice controls specified in subsections (2) through (4) of this section.
 - (b) The written program shall include at least the following:
 - (i) A description of each coke oven operation by battery, including work force and operating crew, coking time, operating procedures and maintenance practices;
 - (ii) Engineer plans and other studies used to determine the controls for the coke battery;
 - (iii) A report of the technology considered in meeting the permissible exposure limit;
 - (iv) Monitoring data obtained in accordance with WAC 296-62-20007.
 - (v) A detailed schedule for the implementation of the engineer and work practice controls specified in subsections (2) through (4) of this section; and
 - (vi) Other relevant information.
 - (c) If, after implementing all controls required by subsections (2) through (4) of this section, or after January 20, 1980, whichever is sooner, or after completion of a new or rehabilitated battery the permissible exposure limit is still exceeded, the employer shall develop a detailed written program and schedule for the implementation of any additional engineer controls and work practices necessary to reduce exposure to or below the permissible exposure limit.
 - (d) Written plans for such programs shall be submitted, upon request, to the director, and shall be available at the worksite for examination and copying by the director, and the authorized employee representative. The plans required under this subsection shall be revised and updated at least every six months to reflect the current status of the program.

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- (7) **Training in compliance procedures.** The employer shall incorporate all written procedures and schedules required under this section in the education and training program required under WAC 296-62-20019 and, where appropriate, post in the regulated area.

[Statutory Authority: Chapter 49.17 RCW. 88-23-054 (Order 88-25), 296-62-20009, filed 11/14/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-16-009 (Order 86-28), 296-62-20009, filed 7/25/86; Order 77-14, 296-62-20009, filed 7/25/77.]

WAC 296-62-20011 Respiratory protection.

- (1) **General.** For employees who use respirators required by this section, the employer must provide respirators that comply with the requirements of this section. Compliance with the permissible exposure limit may not be achieved by the use of respirators except during:
- (a) Periods necessary to install or implement feasible engineering and work-practice controls;
 - (b) Work operations, such as maintenance and repair activity, for which engineering and work-practice controls are technologically not feasible;
 - (c) Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposure to or below the permissible exposure limit;
 - (d) Emergencies.
- (2) **Respirator program.** The employer must implement a respiratory protection program as required by chapter 296-842 WAC, except WAC 296-842-13005 and 296-842-14005.
- (3) **Respirator selection.** The employer must select appropriate respirators or combination of respirators from Table I of this section.

TABLE I	
RESPIRATORY PROTECTION FOR COKE OVEN EMISSIONS	
Airborne concentration of coke oven emissions	Required respirator
(i) Any concentration.	(A) A Type C supplied air respirator operated in pressure demand or other positive pressure or continuous flow mode; or (B) A powered air-purifying particulate filter respirator for dust, mist, and fume; or (C) A powered air-purifying particulate filter respirator combination chemical cartridge and particulate filter for coke oven emissions.
(ii) Concentrations not greater than 1500 µg/m ³ .	(A) Any particulate filter respirator for dust, mist and fume, except single-use respirator; or (B) Any particulate filter respirator or combination chemical cartridge and particulate filter respirator for coke oven emissions; or (C) Any respirator listed in subsection (2)(a)(i) of this section.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 05-03-093 (Order 04-41), § 296-62-20011, filed 01/18/05, effective 03/01/05. Statutory Authority: RCW 49.17.010, .040, .050. 99-10 (Order 98-10) § 296-62-20011, filed 05/04/99, effective 09/01/99.] Statutory Authority: RCW 49.17.040 and 49.17.050. 86-16-009 (Order 86-28), 296-62-20011, filed 7/25/86. Statutory Authority: 49.17.040, 49.17.050, and 49.17.240. 81-16-015 (Order 81-20), 296-62-20011, filed 7/27/81; Order 77-14, 296-62-20011, filed 7/25/77.]

WAC 296-62-20013 Protective clothing and equipment.

- (1) **Provision and Use.** The employer shall provide and assure the use of appropriate protective clothing and equipment, such as but not limited to:
 - (a) Flame resistant jacket and pants;
 - (b) Flame resistant gloves;
 - (c) Face shields or vented goggles which comply with WAC 296-800-160;
 - (d) Footwear providing insulation from hot surfaces;
 - (e) Safety shoes which comply with WAC 296-800-160; and
 - (f) Protective helmets which comply with WAC 296-800-160.
- (2) **Cleaning and Replacement.**
 - (a) The employer shall provide the protective clothing required by subsection (1)(a) and (b) of this section in a clean and dry condition at least weekly.
 - (b) The employer shall clean, launder, or dispose of protective clothing required by subsections (1)(a) and (b) of this section.
 - (c) The employer shall repair or replace the protective clothing and equipment as needed to maintain their effectiveness.
 - (d) The employer shall assure that all protective clothing is removed at the completion of a work shift only in change rooms prescribed in WAC 296-62-20015.
 - (e) The employer shall assure that contaminated protective clothing which is to be cleaned, laundered, or disposed of, is placed in a closed container in the changeroom.
 - (f) The employer shall inform any person who cleans or launders protective clothing required by this section, of the potentially harmful effects of exposure to coke oven emissions.

[Statutory Authority: RCW 49.17.010, .040, .050. 01-11-038, (Order 99-36), § 296-62-20013, filed 05/09/01, effective 09/01/01. Order 77-14, 296-62-20013, filed 7/25/77.]

WAC 296-62-20015 Hygiene facilities and practices.

- (1) **Change rooms.** The employer shall provide clean change rooms equipped with storage facilities for street clothes and separate storage facilities for protective clothing and equipment whenever employees are required to wear protective clothing and equipment in accordance with WAC 296-62-20013.
- (2) **Showers.**
 - (a) The employer shall assure that employees working in the regulated area shower at the end of the work shift.
 - (b) The employer shall provide shower facilities in accordance with WAC 296-800-230.
- (3) **Lunchrooms.** The employer shall provide lunchroom facilities which have a temperature controlled, positive pressure, filtered air supply, and which are readily accessible to employees working in the regulated area.

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(4) Lavatories.

- (a) The employer shall assure that employees working in the regulated area wash their hands and face prior to eating.
- (b) The employer shall provide lavatory facilities in accordance with WAC 296-800-230.

(5) Prohibition of activities in the regulated area.

- (a) The employer shall assure that in the regulated area, food or beverages are not present or consumed, smoking products are not present or used, and cosmetics are not applied, except, that these activities may be conducted in the lunchrooms, change rooms and showers required under subsection (1)-(3) of this section.
- (b) Drinking water may be consumed in the regulated area.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 03-18-090 (Order 03-15), § 296-62-20015, filed 09/02/03, effective 11/01/03. Statutory Authority: RCW 49.17.010, .040, .050. 01-11-038, (Order 99-36), § 296-62-20015, filed 05/09/01, effective 09/01/01. Order 77-14, 296-62-20015, filed 7/25/77.]

WAC 296-62-20017 Medical surveillance.

(1) General requirements.

- (a) Each employer shall institute a medical surveillance program for all employees who are employed in the regulated areas at least 30 days per year.
- (b) This program shall provide each employee covered under subsection (1)(a) of this section with an opportunity for medical examinations in accordance with this section.
- (c) The employer shall inform any employee who refuses any required medical examination of the possible health consequences of such refusal and shall obtain a signed statement from the employee indicating that the employee understands the risk involved in the refusal to be examined.
- (d) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and are provided without cost to the employee.

(2) Initial examinations. At the time of initial assignment to a regulated area or upon the institution of the medical surveillance program, the employer shall provide a medical examination including at least the following elements:

- (a) A work history and medical history which shall include smoking history and the presence and degree of respiratory symptoms, such as breathlessness, cough, sputum production, and wheezing;
- (b) A 14" x 17" posterior-anterior chest x-ray and International Labour Office UICC/Cincinnati (ILO U/C) rating;
- (c) Pulmonary function tests including forced vital capacity (FVC) and forced expiratory volume at one second (FEV 1.0) with recording of type of equipment used;
- (d) Weight;
- (e) A skin examination;
- (f) Urinalysis for sugar, albumin, and hematuria; and
- (g) A urinary cytology examination.

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(3) Periodic examinations.

- (a) The employer shall provide the examinations specified in subsections (2)(a)-(f) of this section at least annually for employees covered under subsection (1)(a) of this section.
- (b) The employer shall provide the examinations specified in subsection (2)(a) and (c)-(g) of this section at least semi-annually for employees 45 years of age or older or with five or more years employment in the regulated area.
- (c) Whenever an employee who is 45 years of age or older or with five or more years employment in the regulated area transfers or is transferred from employment in a regulated area, the employer shall continue to provide the examinations specified in subsections (2)(a) and (c)-(g) of this section semi-annually, as long as that employee is employed by the same employer or a successor employer.
- (d) The employer shall provide the x-ray specified in subsection (2)(b) of this section at least annually for employees covered under this subsection.
- (e) Whenever an employee has not taken the examination specified in subsections (3)(a)-(c) of this section within the six months preceding the termination of employment, the employer shall provide such examinations to the employee upon termination of employment.

(4) Information provided to the physician. The employer shall provide the following information to the examining physician:

- (a) A copy of this regulation and its Appendixes;
- (b) A description of the affected employee's duties as they relate to the employee's exposure;
- (c) The employee's exposure level or anticipated exposure level;
- (d) A description of any personal protective equipment used or to be used; and
- (e) Information from previous medical examinations of the affected employee which is not readily available to the examining physician.

(5) Physician's written opinion.

- (a) The employer shall obtain a written opinion from the examining physician which shall include:
 - (i) The results of the medical examinations;
 - (ii) The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from exposure to coke oven emissions;
 - (iii) Any recommended limitations upon the employee's exposure to coke oven emissions or upon the use of protective clothing or equipment such as respirators; and
 - (iv) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further explanation or treatment.
- (b) The employer shall instruct the physician not to reveal in the written opinion specific findings or diagnoses unrelated to occupational exposure.

WAC 296-62-20017 (Cont.)

(c) The employer shall provide a copy of the written opinion to the affected employee.
[Statutory Authority: RCW 49.17.010, .040, .050. 99-17-094 (Order 99-01), § 296-62-20017, filed 08/17/99, effective 12/01/99.
Statutory Authority: RCW 49.17.010, [49.17].040 and [49.17].050. 98-02-030, 296-62-20017, filed 12/31/97, effective 1/31/98;
Order 77-14, 296-62-20017, filed 7/25/77.]

WAC 296-62-20019 Employee information and training.

(1) Training program.

- (a) The employer shall institute a training program for employees who are employed in the regulated area and shall assure their participation.
- (b) The training program shall be provided as of January 20, 1977, for employees who are employed in the regulated area at that time or at the time of initial assignment to a regulated area.
- (c) The training program shall be provided at least annually for all employees who are employed in the regulated area, except that training regarding the occupational safety and health hazards associated with exposure to coke oven emissions and the purpose, proper use, and limitations of respiratory protective devices shall be provided at least quarterly until January 20, 1978.
- (d) The training program shall include informing each employee of:
 - (i) The information contained in the substance information sheet for coke oven emissions (Appendix A);
 - (ii) The purpose, proper use, and limitations of respiratory protective devices in addition to other information as required by chapter 296-842 WAC, (see WAC 296-842-11005, 296-842-16005, and 296-842-19005.
 - (iii) The purpose for and a description of the medical surveillance program required by WAC 296-62-20017 including information on the occupational safety and health hazards associated with exposure to coke oven emissions;
 - (iv) A review of all written procedures and schedules required under WAC 296-62-20009; and
 - (v) A review of this standard.

(2) Access to training materials.

- (a) The employer shall make a copy of this standard and its appendixes readily available to all employees who are employed in the regulated area.
- (b) The employer shall provide all materials relating to the employee information and training program to the director.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 05-03-093 (Order 04-41), § 296-62-20019, filed 01/18/05, effective 03/01/05. Statutory Authority: RCW 49.17.010, .040, .050. 99-10 (Order 98-10) § 296-62-20019, filed 05/04/99, effective 09/01/99.] Statutory Authority: Order 77-14, 296-62-20019, filed 7/25/77.]

WAC 296-62-20021 Precautionary signs and labels.

(1) General.

- (a) The employer may use labels or signs required by other statutes, regulations or ordinances in addition to, or in combination with, signs and labels required by this section.
- (b) The employer shall assure that no statement appears on or near any sign required by this section which contradicts or detracts from the effects of the required sign.

WAC 296-62-20021(Cont.)

- (c) The employer shall assure that signs required by this section are illuminated and cleaned as necessary so that the legend is readily visible.

(2) **Signs.**

- (a) The employer shall post signs in the regulated area bearing the legends:

**DANGER
CANCER HAZARD
AUTHORIZED PERSONNEL ONLY
NO SMOKING OR EATING**

- (b) In addition, not later than January 20, 1978, the employer shall post signs in the areas where the permissible exposure limit is exceeded bearing the legend:

RESPIRATOR REQUIRED

- (3) **Labels.** The employer shall apply precautionary labels to all containers of protective clothing contaminated with coke oven emissions. The label shall bear the following legend:

**CAUTION
CLOTHING CONTAMINATED WITH COKE
EMISSIONS
DO NOT REMOVE DUST BY BLOWING OR SHAKING**

[Order 77-14, 296-62-20021, filed 7/25/77.]

WAC 296-62-20023 Recordkeeping.

- (1) **Exposure measurements.** The employer shall establish and maintain an accurate record of all measurements taken to monitor employee exposure to coke oven emissions required in WAC 296-62-20007.

- (a) This record shall include:
 - (i) Name, social security number, and job classification of the employees monitored;
 - (ii) The date(s), number, duration and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable;
 - (iii) The type of respiratory protective devices worn, if any;
 - (iv) A description of the sampling and analytical methods used and evidence of their accuracy; and
 - (v) The environment variables that could affect the measurement of employee exposure.
- (b) The employer shall maintain this record for at least 40 years or for the duration of employment plus 20 years, whichever is longer.

- (2) **Medical surveillance.** The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by WAC 296-62-20017.

- (a) The record shall include:

WAC 296-62-20023 (Cont.)

- (i) The name, social security number, and description of duties of the employee;
 - (ii) A copy of the physician's written opinion;
 - (iii) The signed statement of any refusal to take a medical examination under WAC 296-62-20017; and
 - (iv) Any employee medical complaints related to exposure to coke oven emissions.
 - (b) The employer shall keep, or assure that the examining physician keeps, the following medical records:
 - (i) A copy of the medical examination results including medical and work history required under WAC 296-62-20017;
 - (ii) A description of the laboratory procedures used and a copy of any standards or guidelines used to interpret the test results;
 - (iii) The initial x-ray;
 - (iv) The x-rays for the most recent 5 years;
 - (v) Any x-ray with a demonstrated abnormality and all subsequent x-rays;
 - (vi) The initial cytologic examination slide and written description;
 - (vii) The cytologic examination slide and written description for the most recent 10 years; and
 - (viii) Any cytologic examination slides with demonstrated atypia, if such atypia persists for 3 years, and all subsequent slides and written descriptions.
 - (c) The employer shall maintain medical records required under subsection (2) of this section for at least 40 years, or for the duration of employment plus 20 years, whichever is longer.
- (3) **Availability.**
- (a) The employer shall make available upon request all records required to be maintained by this section to the director for examination and copying.
 - (b) Employee exposure measurement records and employee medical records required by this subsection shall be provided upon request to employees, designated representatives, and the assistant director in accordance with chapter 296-802 WAC.
 - (c) The employer shall make available upon request employee medical records required to be maintained by subsection (2) of this section to a physician designated by the affected employee or former employee.
- (4) **Transfer of records.**
- (a) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by this section.

WAC 296-62-20023 (Cont.)

- (b) Whenever the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, these records shall be transmitted by registered mail to the director.
- (c) At the expiration of the retention period for the records required to be maintained under subsections (1) and (2) of this section, the employer shall transmit these records by registered mail to the director or shall continue to retain such records.
- (d) The employer shall also comply with any additional requirements involving transfer of records set forth in chapter 296-802 WAC.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 04-10-026 (Order 03-04) § 296-62-20023, filed 04/27/04, effective 08/01/04. Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 81-18-029 (Order 81-21), 296-62-20023, filed 8/27/81; Order 77-14, 296-62-20023, filed 7/25/77.]

WAC 296-62-20025 Observation of monitoring.

- (1) **Employee observation.** The employer shall provide affected employees or their representatives an opportunity to observe any measuring or monitoring of employee exposure to coke oven emissions conducted pursuant to WAC 296-62-20007.
- (2) **Observation procedures.**
 - (a) Whenever observation of the measuring or monitoring of employee exposure to coke oven emissions requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the observer with and assure the use of such equipment and shall require the observer to comply with all other applicable safety and health procedures.
 - (b) Without interfering with the measurement, observers shall be entitled to:
 - (i) An explanation of the measurement procedures;
 - (ii) Observe all steps related to the measurement of coke oven emissions performed at the place of exposure; and
 - (iii) Record the results obtained.

[Order 77-14, 296-62-20025, filed 7/25/77.]

WAC 296-62-20027 Appendix A--Coke oven emissions substance information sheet.

**APPENDIX A
COKE OVEN EMISSIONS
SUBSTANCE INFORMATION SHEET**

I. SUBSTANCE IDENTIFICATION

- (1) Substance: Coke oven emissions
- (2) Definition: The benzene-soluble fraction of total particulate matter present during the destructive distillation or carbonization of coal for the production of coke.
- (3) Permissible exposure limit: 150 micrograms per cubic meter of air determined as an average over an 8-hour period.

WAC 296-62-20027 (Cont.)

- (4) Regulated areas: Only employees authorized by your employer should enter a regulated area. The employer is required to designate the following areas as regulated areas: the coke oven battery, including topside and its machinery, pushside and its machinery, and the screening station; and the wharf, the beehive ovens and machinery.

II. HEALTH HAZARD DATA

Exposure to coke oven emissions is a cause of lung cancer, and possibly kidney cancer, in humans. Although it does not have an excess number of skin cancer cases in humans, repeated skin contact with coke oven emissions should be avoided.

III. PROTECTIVE CLOTHING AND EQUIPMENT

- (1) Respirators: Respirators will be provided by your employer for routine use if your employer is in the process of implementing engineering and work practice controls or where engineering and work practice controls are not feasible or insufficient. You must wear respirators for nonroutine activities or in emergency situations where you are likely to be exposed to levels of coke oven emissions in excess of the permissible exposure limit. Since how well your respirator fits your face is very important, your employer is required to conduct fit tests to make sure the respirator seals properly when you wear it. These tests are simple and rapid and will be explained to you during your training sessions.
- (2) Protective clothing: Your employer is required to provide, and you must wear, appropriate, clean, protective clothing and equipment to protect your body from repeated skin contact with coke oven emissions and from the heat generated during the coking process. This clothing should include such items as jacket and pants and flame resistant gloves. Protective equipment should include face shield or vented goggles, protective helmets and safety shoes, insulated from hot surfaces where appropriate.

IV. HYGIENE FACILITIES AND PRACTICES

You must not eat, drink, smoke, chew gum or tobacco, or apply cosmetics in the regulated area, except that drinking water is permitted. Your employer is required to provide lunchrooms and other areas for these purposes.

Your employer is required to provide showers, washing facilities, and change rooms. If you work in a regulated area, you must wash your face, and hands before eating. You must shower at the end of the work shift. Do not take used protective clothing out of the change rooms without your employer's permission. Your employer is required to provide for laundering or cleaning of your protective clothing.

V. SIGNS AND LABELS

Your employer is required to post warning signs and labels for your protection. Signs must be posted in regulated areas. The signs must warn that a cancer hazard is present, that only authorized employees may enter the area, and that no smoking or eating is allowed. In regulated areas where coke oven emissions are above the permissible exposure limit, the signs should also warn that respirators must be worn.

VI. MEDICAL EXAMINATIONS

If you work in a regulated area at least 30 days per year, your employer is required to provide you with a medical examination every year. The medical examination must include a medical history, a chest x-ray; pulmonary function test; weight comparison; skin examination; a urinalysis and a urine cytology exam for the early detection of urinary cancer. The urine cytology exam is only included in the initial exam until you are either forty-five years or older, or have five or more years employment in the regulated areas when the medical exams including this test, but excepting the x-ray exam, are to be given every six months; under these conditions, you are to be given an x-ray exam at least once a year. The examining physician will provide a written opinion to your employer containing the results of the medical exams. You should also receive a copy of this opinion.

WAC 296-62-20027 (Cont.)

VII. OBSERVATION OF MONITORING

Your employer is required to monitor your exposure to coke oven emissions and you are entitled to observe the monitoring procedure. You are entitled to receive an explanation of the measurement procedure, observe the steps taken in the measurement procedure, and to record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn, you must also be provided with and must wear the protective clothing and equipment.

VIII. ACCESS TO RECORDS

You or your representative are entitled to records of your exposure to coke oven emissions upon request to your employer. Your medical examination records can be furnished to your physician upon request to your employer.

IX. TRAINING AND EDUCATION

Additional information on all of these items plus training as to hazards of coke oven emissions and the engineering and work practice controls associated with your job will also be provided by your employer.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-17-094 (Order 99-01), § 296-62-20027, filed 08/17/99, effective 12/01/99. Statutory Authority: RCW 49.17.010, .040, .050. 99-10 (Order 98-10) § 296-62-20027, filed 05/04/99, effective 09/01/99.] Statutory Authority: RCW 49.17.010, [49.17].040 and [49.17].050. 98-02-030, 296-62-20027, filed 12/31/97, effective 1/31/98; Order 77-14, Appendix A (codified as WAC 296-62-20027), filed 7/25/77.]

WAC 296-62-20029 Appendix B--Industrial hygiene and medical surveillance guidelines.

**APPENDIX B
INDUSTRIAL HYGIENE AND MEDICAL
SURVEILLANCE GUIDELINES**

I. INDUSTRIAL HYGIENE GUIDELINES

(1) Sampling. (Benzene-Soluble Fraction Total Particulate Matter.)

Samples collected should be full shift (8-hour) samples. Sampling should be done using a personal sampling pump with pulsation damper at a flow rate of 2 liters per minute. Samples should be collected on 0.8 micrometer pore size silver membrane filters (37 mm diameter) preceded by Gelman glass fiber type A filters encased in three-piece plastic (polystyrene) field monitor cassettes. The cassette face cap should be on and the plug removed. The rotameter should be checked every hour to ensure that proper flow rates are maintained.

A minimum of three full-shift samples should be collected for each job classification on each battery, at least one from each shift. If disparate results are obtained for particular job classification, sampling should be repeated. It is advisable to sample each shift on more than one day to account for environmental variables (wind, precipitation, etc.) which may affect sampling. Differences in exposures among different work shifts may indicate a need to improve work practices on a particular shift. Sampling results from different shifts for each job classification should not be averaged. Multiple samples from same shift may be used to calculate an average exposure for a particular job classification.

(2) Analysis.

- (a) All extraction glassware is cleaned with dichromic acid cleaning solution, rinsed with tap water, then deionized water, acetone, and allowed to dry completely. The glassware is rinsed with nanograde benzene before use. The Teflon cups are cleaned with benzene then with acetone.

WAC 296-62-20029 (Cont.)

- (b) Pre-weigh the 2 ml Perkin-Elmer Teflon cups to one hundredth of a milligram on a Perkin-Elmer autobalance AD 2. Tare weight of the cups is about 50 mg.
- (c) Place the silver membrane filter and glass fiber filter into a 15 ml test tube.
- (d) Extract with 5 ml of benzene for five minutes in an ultrasonic cleaner.
- (e) Filter the extract in 15 ml medium glass fritted funnels.
- (f) Rinse test tube and filters with two 1.5 ml aliquots of benzene and filter through the fritted glass funnel.
- (g) Collect the extract and two rinses in a 10 ml Kontes graduated evaporative concentrator.
- (h) Evaporate down to a 1 ml while rinsing the sides with benzene.
- (i) Pipet 0.5 ml into the Teflon cup and evaporate to dryness in a vacuum oven at 40°C for 3 hours.
- (j) Weight the Teflon cup and the weight gain is due to the benzene soluble residue in half the sample.

II. MEDICAL SURVEILLANCE GUIDELINES

(1) General.

The minimum requirements for the medical examination for coke oven workers are given in WAC 296-62-20017.

The initial examination is to be provided to all coke oven workers who work at least thirty days in the regulated area. The examination includes a 14" x 17" posterior-anterior chest x-ray and a ILO/UC rating to assure some standardization of x-ray reading, pulmonary function tests (FVC and FEV 1.0), weight, urinalysis, skin examination and a urinary cytologic examination. These tests are to serve as the baseline for comparing the employee's future test results. Periodic exams include all the elements of the initial exams, except that the urine cytologic test is to be performed only on those employees who are forty-five years of age or older or who have worked for five or more years in the regulated area; periodic exams, with the exception of x-rays, are to be performed semiannually for this group instead of annually; for this group, x-rays will continue to be given at least annually. The examination contents are minimum requirements, additional tests such as lateral and oblique x-rays or additional pulmonary function tests may be performed if deemed necessary.

(2) Pulmonary function tests.

Pulmonary function tests should be performed in a manner which minimizes subject and operator bias. There has been shown to be learning effects with regard to the results obtained from certain tests, such as FEV 1.0. Best results can be obtained by multiple trials for each subject. The best of three trials or the average of the last three of five trials may be used in obtaining reliable results. The type of equipment used (manufacturer, model, etc.) should be recorded with the results as reliability and accuracy varies and such information may be important in the evaluation of test results. Care should be exercised to obtain the best possible testing equipment.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-17-094 (Order 99-01), § 296-62-20029, filed 08/17/99, effective 12/01/99.
Statutory Authority: RCW 49.17.010, [49.17].040 and [49.17].050. 98-02-030, 296-62-20029, filed 12/31/97, effective 1/31/98;
Order 77-14, Appendix B (codified as WAC 296-62-20029), filed 7/25/77.]